REMARKS

Claim 1 is in the sole claim in the application and has been rejected, first, under 35 USC §112, second paragraph, on grounds of indefiniteness and, secondly, under 35 USC §102(b) as being anticipated by JA 7-286720.

The comments made by the Examiner in the Office Action have been considered and, pursuant to the rejections contained in the Office Action, the application is hereby amended to the extent, in order to overcome the rejection under 35 USC §112, second paragraph, of expressly reciting in lines 3 to 6 of claim 1 that: "each of the on-off-devices on the respective sides of the fluid controllers comprising one valve or a plurality of adjacent valves, with the one valve or the adjacent valves interconnecting each other and with the fluid controllers without using tubing." Consequently, the claim is expanded in scope to be made to contemplate on-off devices which may be adjacent the associated fluid controller as well as adjacent valves.

It is submitted further that claim 1, as now amended, distinguishes over the apparatus disclosed in **JA 7-286720** because in the reference device the valve mounts 10 and 11 do not comprise "joint members" which each contain passages "extending entirely internally with the associated joint member and opening in the upper surface thereof," as now recited in the claim. The device of the reference further fails to embody valve mounts wherein the channels therein hold the adjacent inlet port and outlet port of adjacent valves in communication with each other. Note that, instead, the passages 16 and 18 in valve mounts 11, 19 and 20 in valve mount 10 are arranged to communicate with an adjacent valve mount rather than with "ports in the bottom faces of (adjacent)

valves or fluid controller." (In order to assist the Examiner's consideration of **JA 7-286720** against the claim as amended, Applicants submit herewith an English language translation of the document.)

Consequently, for the foregoing reasons it is submitted that the claim, as amended, clearly defines the invention in accordance with the provisions of 35 USC §112, second paragraph, and is patentable over the Japanese reference. Therefore, Applicants respectfully request that this Amendment be favorably considered by the Examiner and allowed.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP

John F. Carney
Attorney for Applicant
Reg. No. 20,276

JFC/lms
Atty. Docket No. **980150**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930

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PATENT TRADEMARK OFFICE

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PATENT ABSTRACTS OF JAPAN

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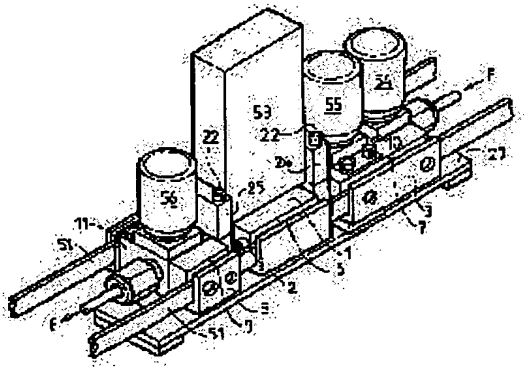
(71)Applicant : CKD CORP
(72)Inventor : BANDOU HIROSHI
NITTA SHINICHI
KOKETSU MASAYUKI

(54) GAS SUPPLYING APPARATUS

(57)Abstract:
PURPOSE: To easily remove or attach a flow control valve with a mass flowmeter by providing coupling means for attaching the valve to input and output blocks by an operation from above.
CONSTITUTION: Heat of a tapelike heater 51 is transmitted to a solenoid valve 53 with a mass flowmeter via a heat transfer block to be brought into close contact by a pressing spring 2 provided under the valve 53. Heat of the heater 51 is transferred to an input block 10 and an output block 11 via a sub-heat transfer block 3 attached to the blocks 10, 11. The blocks 1, 3 are held at holding grooves 6, 7 opened above, and the valve 53 is mounted via mounting blocks 24, 25 attached or detached only by an operation from above. Thus, a gas passage in a gas supplying apparatus can be uniformly heated to be heat insulated at a predetermined temperature or higher, and gas which is easily liquefied can be effectively supplied in a necessary quantity without liquefying it.



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* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the gas transfer unit supplied to high degree of accuracy, without making process gas, such as 6 JIKURORU silane [which will be easy to liquefy if evaporation temperature is still higher in details and heat is not applied from the exterior in ordinary temperature] (SiH2Cl2), and tungsten fluoride (WF6), and chlorine trifluoride (ClF3), liquefy about the gas transfer unit used with semiconductor fabrication machines and equipment etc.
[0002]
[Description of the Prior Art] Conventionally, the oxidation silicon thin film by which gaseous-phase membrane formation was carried out is used abundantly as an insulator layer in a semiconductor integrated circuit. As for gaseous-phase membrane formation of this oxidation silicon etc., it is common to carry out by the chemical-vacuum-deposition forming-membranes method on the wafer laid into the membrane formation tub. As a silicon source of supply for that, many things which are easy to liquefy are also used, for example by ordinary temperature ordinary pressure not only like what is a gas in ordinary temperature ordinary pressure like a mono silane (SiH4) but a JIKURORU silane.
[0003] When supplying the process gas which is easy to liquefy, such as a JIKURORU silane, it is necessary to heat gas lines, such as a high-pressure bomb which is the supply root of process gas, piping, and a massflow controller. The reason is that the amount of distributed gas to a reaction chamber will become inaccurate, and it will worsen the engine performance of the semiconductor integrated circuit manufactured since flow rate measurement cannot carry out correctly if a JIKURORU silane liquefies in the middle of a gas line. Moreover, there is also a problem on which the liquefied JIKURORU silane etc. blocks with the capillary of a flow control valve with a mass flowmeter, and shortens a life. In order to prevent liquefaction of process gas, such as a JIKURORU silane, as shown, for example in drawing 7 , with the conventional gas transfer unit, heating incubation was carried out by making the tape-like heater 51 meet the both sides of the gas line constituted by piping, a joint, gas valves 52 and 54, and solenoid-valve 53 grade with a mass flowmeter, and fixing in the union band 56 so that a JIKURORU silane etc. might become beyond evaporation temperature.
[0004]
[Problem(s) to be Solved by the Invention] However, there were the following troubles in heating incubation of said conventional gas transfer unit. As shown in drawing 7 , the gas transfer unit consists of solenoid-valve 53 grades with two or more gas valves 52 and 54, a joint, and a mass flowmeter from which a configuration differs, and a level difference is in an appearance. On the other hand, skill was required, in order to have made it stick to the surface of gas valves 52 and 54, a joint, and the solenoid valve 53 with a mass flowmeter equally and to have fixed to it, since the life became short when execution which an open circuit of a core wire tends to produce the tape-like heater 51, and was bent especially to a right angle or an acute angle was carried out.
[0005] Especially gas valves 52 and 54, a joint, and the solenoid valve 53 with a mass flowmeter differ from each other in the thickness of an outer wall etc., respectively. And although the

process gas to supply does not liquefy, if the temperature may change a lot, since measurement of the mass flow rate of the solenoid valve 53 with a mass flowm ter will become inaccurate and will have a bad influence on a semiconductor manufacture process, it is necessary to control process gas to constant temperature as much as possible. for this reason, the tape-like heater 51 -- **** -- dependent on experience of an operator about whether heating incubation of the process gas which will pass through the inside of gas valves 52 and 54, a joint, and the solenoid valve 53 with a mass flowmeter if it attaches like and which is easy to liquefy is carried out at homogeneity, and liquefaction can be prevented. However, by the method using the heater 51 of the shape of a conventional tape, since experience of an operator was entrusted, temperature nonuniformity -- the part which heat does not reach is generated -- tended to arise. For this reason, a cure which attached the tape-like heater 51 and which covers a it top with a heat insulator further was needed.

[0006] For this reason, when exchanging for the maintenance of solenoid-valve 53 grade with a mass flowmeter, the heat insulator and the tape-like heater 51 needed to be removed one by one, exchange took several hours, and it had become the failure of the improvement in an operating ratio of a semiconductor manufacture process. In the gas line, since especially the solenoid valves 53 with a mass flowmeter were components with high maintenance frequency, its problem was large. Moreover, usually it was crowded with the devices of the gas line and others of other process gas around the gas line, and especially the desorption of a heat insulator was very complicated from activity access not being good. Furthermore, since how to cover a heat insulator was correctly unreproducible, there was a case where the process conditions after maintenance changed and it had a bad influence on a semiconductor manufacturing process.

[0007] This invention is the gas transfer unit which can supply to specified-quantity accuracy, and it aims at offering a gas transfer unit possible [without / to a gas line / installing and basing exact reappearance of next temperature conditions on experience of an operator etc.] possible [the desorption of a flow control valve with a mass flowmeter] easily, without removing a tape-like heater etc., solving the trouble of the above-mentioned conventional technology, heating the process gas which is easy liquefying in ordinary-temperature ordinary pressure, and keeping it warm to constant temperature.

[0008]

[Means for Solving the Problem] In order to attain this purpose, a gas transfer unit of this invention A flow control valve with a mass flowmeter which passes a gas of a predetermined mass flow rate while measuring a mass flow rate of a gas supplied, It has input block linked to input port of a flow control valve with a mass flowmeter, and an output block linked to an output port of a flow control valve with a mass flowmeter. A connection means by which are the gas transfer unit which supplies a gas which is easy to liquefy by ordinary temperature ordinary pressure, and actuation from the upper part performs desorption to said input block and said output block of said flow control valve with a mass flowmeter, Retention groove in which the upper part carried out Kaisei, and the contact surface in contact with an inferior surface of tongue of said flow control valve with a mass flowmeter are formed. It considers as a configuration characterized by having a heat transfer member which prevents liquefaction of a gas which transmits heat which an exoergic means inserted in retention groove generates to said flow control valve with a mass flowmeter via the contact surface, and is supplied.

[0009] Moreover, a flow control valve with a mass flowmeter of a gas transfer unit of this invention is considered as the aforementioned configuration characterized by having an elastic means by which said contact surface of said heat transfer member energizes said heat transfer member in the direction stuck to an inferior surface of tongue of said flow control valve with a mass flowmeter. Moreover, a flow control valve with a mass flowmeter of a gas transfer unit of this invention has the 2nd retention groove in which the upper part carried out Kaisei, and is considered as the aforementioned configuration characterized by having the 2nd heat transfer member which prevents liquefaction of a gas supplied by transmitting heat which an exoergic means inserted in the 2nd retention groove generates to said input block or said output block on one [at least] side of said input block or said output block.

[0010]

[Function] In the gas transfer unit of this invention which consists of the above-mentioned configuration, the gas which is easy to liquefy by the ordinary temperature ordinary pressure of the specified quantity is supplied, measuring a mass flow rate by the flow control valve with a mass flowmeter. Here, the heat transfer member in which a flow control valv with a mass flowmeter is prepared caudad prevents liquefaction of the gas with which the upper part transmits heat and supplies the heat from an exoergic means to hold to the retention groove which carried out Kaisei to a flow control valve with a mass flowmeter through the contact surface. Moreover, the flow control valve with a mass flowmeter is attached in input block and an output block through a connection means by actuation from the upper part. Moreover, in the gas transfer unit of this invention, the elastic means pressed the contact surface of a heat transfer member on the inferior surface of tongue of a flow control valve with a mass flowmeter, and heat transfer effectiveness is improved. Moreover, in the gas transfer unit of this invention, the 2nd heat transfer member transmits the heat of the exoergic means inserted in the 2nd retention groove to input block or an output block, and prevents liquefaction of the gas to supply.

[0011]

[Example] Hereafter, the gas transfer unit which is one example which materialized this invention is explained to details, referring to a drawing. A conceptual diagram shows the whole gas transfer unit configuration to drawing 1 , and the perspective diagram is shown in drawing 2 . Input block 10 is attached to the input port of the solenoid valve 53 with a mass flowmeter which is a flow control valve with a mass flowmeter through the attachment block 24. The input open clausilium 54 and a purge valve 55 are attached to the upper surface of input block 10. The output block 11 is attached to the output port of the solenoid valve 53 with a mass flowmeter through the attachment block 25. The output open clausilium 56 is attached to the upper surface of an output block 11.

[0012] The free passage way 20 linked to the input port of the input open clausilium 54, the free passage way 19 which opens the output port of the input open clausilium 54, the input port of the solenoid valve 53 with a mass flowmeter, and the output port of a purge valve 55 for free passage through the free passage way of the attachment block 24, and the free passage way 26 linked to the input port of a purge valve 55 are drilled in input block 10. The free passage way 20 is open for free passage to the source of supply of process gas (here, it considers as the JIKURORU silane F). Moreover, the free passage way 26 is open for free passage in the source of nitrogen gas supply for a purge through the free passage way formed in the crossing block 126 which connects input block 10 across boundaries.

[0013] The free passage way 16 linked to the output port of the output open clausilium 56 and the free passage way 18 which opens the input port of the output open clausilium 56 and the output port of the solenoid valve 53 with a mass flowmeter for free passage through the free passage way of the attachment block 25 are drilled in the output block 11. The free passage way 16 is open for free passage at the supply place which uses the JIKURORU silane F at a semiconductor production process. The solenoid valve 53 with a mass flowmeter is a well-known solenoid valve with a mass flowmeter which has a mass-flowmeter portion and a solenoid-valve portion. Moreover, the input open clausilium 54, a purge valve 55, and the output open clausilium 56 are air operation valves which open for free passage or intercept input port and an output port, respectively. The solenoid valve 53 with a mass flowmeter, the input open clausilium 54, a purge valve 55, and the output open clausilium 56 are controlled by the controller which is not illustrated.

[0014] In the gas transfer unit of this example which has the above-mentioned conceptual configuration, as shown in the perspective diagram of drawing 2 , the solenoid valve 53 with a mass flowmeter, the input open clausilium 54, a purge valve 55, and the output open clausilium 56 are arranged on the pedestal 27 through the input block 10 which attaches these, an output block 11, and the attachment blocks 24 and 25. The attachment blocks 24 and 25 are attached in input block 10 and an output block 11 with the attachment screws 22 and 22 formed in the upper surface. operating the attachment screws 22 and 22 with a screw driver, a hezagonal wrench, etc. from the upper part -- the solenoid valve 53 with a mass flowmeter -- the attachment block 24 -- desorption can be carried out to input block 10 and an output block 11

the whole 25.
[0015] And the lower part of the solenoid valve 53 with a mass flowmeter is equipped with the heat transfer block 1. The heat transfer block 1 is the member of the abbreviation rectangular parallelepiped configuration made from the thermally conductive high quality of the materials (for example, aluminum or an aluminum alloy tc.), and is pressed by the inferior surface of tongue of the solenoid valve 53 with a mass flowmeter according to the energization force of the press spring 2. Moreover, the screw stop of the subheat transfer block 3 is carried out to the side of input block 10 and an output block 11. The subheat transfer block 3 is the member of the abbreviation rectangular parallelepiped configuration formed with the same material as the heat transfer block 1. Retention groove 6 and 7 is formed in the heat transfer block 1 and the subheat transfer block 3, and the tape-like heater 51 is held to retention groove 6 and 7. The tape-like heater 51 is the band-like exoergic instrument which inserted heating wire in the interior, and it is arranged in the perimeter of a gas transfer unit, being held at the retention groove 6 and 7 of the heat transfer block 1 and the subheat transfer block 3. From the gas transfer unit shown in drawing 2 , the condition of having removed the tape-like heater 51 is shown in drawing 6 .
[0016] The heat transfer block 1 is explained with reference to drawing 3 . Drawing 3 is a cross section in the attachment block 24 and the condition of having removed the whole 25 and having also removed the tape-like heater 51, about a gas transfer unit to the solenoid valve 53 with a mass flowmeter. The upper surface of the heat transfer block 1 is the contact surface 4 which contacts the solenoid valve 53 with a mass flowmeter from a lower part. The pinching sections 5 and 5 which pinch the press spring 2 between pedestals 27 are formed in the inferior surface of tongue of the heat transfer block 1. Recesses 8 and 8 are formed in the location which faces the pinching sections 5 and 5 of the contact surface 4, recesses 8 and 8 and the pinching sections 5 and 5 are penetrated, and through holes 31 and 31 are drilled. On the other hand, mounting holes 28 and 28 are drilled in the location which faces the recesses 8 and 8 and the pinching sections 5 and 5 of a pedestal 27. The cylindrical shape-like stanchions 14 and 14 are fixed and attached in mounting holes 28 and 28. Screw holes 30 and 30 are formed in the upper limit of stanchions 14 and 14 from the upper part.
[0017] The heat transfer block 1 is attached so that the press springs 2 and 2 which have a big bore for a while may be put on stanchions 14 and 14 and the upper limit of the press springs 2 and 2 may fit into the pinching sections 5 and 5 from the outer diameter of stanchions 14 and 14. And bolts 9 and 9 are screwed on screw holes 30 and 30, ****(ing) spacers 15 and 15, pressing the heat transfer block 1 caudad. At this time, the press springs 2 and 2 are pinched between the pinching sections 5 and 5 and a pedestal 27. And the base of recesses 8 and 8 has stopped it in contact with spacers 15 and 15, the heat transfer block 1 being energized towards the upper part with the press springs 2 and 2. In this condition, if the depression of the contact surface 4 of the heat transfer block 1 is carried out from the upper part, the elasticity of the press springs 2 and 2 will be resisted and the heat transfer block 1 will move caudad. Here, the location gap of a longitudinal direction is prevented by stanchions 14 and 14.
[0018] If the solenoid valve 53 with a mass flowmeter is attached with the attachment screws 22 and 22 as shown in drawing 4 , the contact surface 4 of the heat transfer block 1 will be pressed by the inferior surface of tongue of the solenoid valve 53 with a mass flowmeter by energization of the press spring 2, and it will stick. The press spring 2 has shrunken in drawing 4 a little from the condition of drawing 3 , and he can understand turning the heat transfer block 1 to the solenoid valve 53 with a mass flowmeter, and energizing it. In the side of the heat transfer block 1, the retention groove 6 by which Kaisei is carried out is formed in the upper part so that it may see to drawing 6 . In the retention groove 6, the tape-like heater 51 can be inserted and removed by the actuation from the upper part. What performed and formed cutting in the heat transfer block 1 from the upper surface is sufficient as the retention groove 6, and what joined and formed the wall-like member in the side is sufficient as it.
[0019] Next, the subheat transfer block 3 is explained. A total of four subheat transfer blocks 3 is attached in the both-sides side of input block 10 and an output block 11, respectively. However, four subheat transfer blocks 3 are made into the configuration doubled with the location attached. The retention groove 6 of the heat transfer block 1 and the same retention

groove 7 can be formed in the side of each ****** block 3, and the tape-like heater 51 can be inserted and removed now by the actuation from the upper part. And the hol 13 is drilled in a part for the wall 12 of the retention groove 7. Since the screw stop of the subheat transfer block 3 is carried out to input block 10 and an output block 11 by actuation of the screw driver from a longitudinal direction etc., it is for letting the screw driver pass.

[0020] Next, an operation of the gas transfer unit which has the above-mentioned configuration is explained. An operation of introduction and the whole gas transfer unit is explained. When supplying the JIKURORU silane F to the manufacturing process of a semiconductor, the solenoid valve 53 with a mass flowmeter, the input open clausilium 54, and output open clausilium 56 are made open, and a purge valve 55 is closed. At this time, the JIKURORU silane F supplied so that it might see to drawing 1 goes to a supply place via the free passage way 20 of input block 10, the input open clausilium 54, the free passage way 19 of input block 10, the free passage way of the attachment block 24, the solenoid valve 53 with a mass flowmeter, the free passage way of the attachment block 25, the free passage way 18 of an output block 11, the output open clausilium 56, and the free passage way 16 of an output block 11. At this time, a mass flow rate can be measured with the solenoid valve 53 with a mass flowmeter, and it can adjust.

[0021] Next, when suspending supply of the JIKURORU silane F, the input open clausilium 54 is closed and the flow of the JIKURORU silane F is intercepted. And a purge valve 55 is opened and the nitrogen gas for a purge is introduced from the source of nitrogen gas supply. At this time, the solenoid valve 53 with a mass flowmeter is considered as full open. Thereby, the supplied nitrogen gas goes to an exhaust air system via the free passage way 26 of the crossing block 126, a purge valve 55, the free passage way 19 of input block 10, the free passage way of the attachment block 24, the solenoid valve 53 with a mass flowmeter, the free passage way of the attachment block 25, the free passage way 18 of an output block 11, the output open clausilium 56, and the free passage way 16 of an output block 11. In this way, the JIKURORU silane F which remains in solenoid-valve 53 grade with a mass flowmeter is discharged, and it fills up with nitrogen gas. And the after [predetermined time of] purge valve 55 is closed, and the inflow of nitrogen is stopped.

[0022] There are two purposes which introduce nitrogen gas. Since plugging will occur and measurement of a mass flow rate will become incorrectness if long duration stagnation of the JIKURORU silane F is carried out into the solenoid valve 53 with a mass flowmeter, one is for preventing it. In case another purpose performs a maintenance of exchange of the solenoid valve 53 with a mass flowmeter etc., it is scavenging the JIKURORU silane F.

[0023] Next, an operation of the heat transfer block 1 and the subheat transfer block 3 in a gas transfer unit is explained. The heat transfer block 1 and the subheat transfer block 3 arrange and use the tape-like heater 51 for retention groove 6 and 7 as mentioned above. Drawing which looked at the condition of having arranged the tape-like heater 51, from the upper part is shown in a gas transfer unit at drawing 5 . If it energizes to the heating wire of the tape-like heater 51 and the Joule's heat is generated while passing the JIKURORU silane F to the gas transfer unit, the heat will be transmitted to the solenoid valve 53 with a mass flowmeter through the heat transfer block 1, and will be transmitted to input block 10 and an output block 11 through the subheat transfer block 3. In this way, the temperature inside solenoid-valve 53 grade with a mass flowmeter is maintained more than the setting point of the JIKURORU silane F, and when the JIKURORU silane F liquefies within a gas transfer unit, it is prevented that various faults occur.

[0024] Here, since the heat transfer block 1 and the subheat transfer block 3 are made from aluminum or the thermally conductive high quality of the material like an aluminum alloy, the transmission efficiency of heat is good. Moreover, that the heat transfer block 1 is stuck by energization of the press spring 2 by the solenoid valve 53 with a mass flowmeter, and the subheat transfer block 3 is stuck by input block 10 or the output block 11 by screw stop immobilization is also contributing to the merit of th transmission efficiency of heat. And since the tape-like heater 51 can be arranged in the whole gas transfer unit along with retention groove 6 and 7 at homogeneity, the temperature of each part in a gas transfer unit can be kept almost constant. The result which calls it 46.5 degrees C by the input open clausilium 54, and

calls a thermocouple 48.7 degrees C with 45.5 degrees C and the solenoid valve 53 with a mass flowmeter by the purge valve 55 at 49.6 degrees C and the output open clausilium 56 when an installation thermometry trial is performed of having excelled was obtained by the input open clausilium 54, the purge valve 55, the solenoid valve 53 with a mass flowmeter, and the output open clausilium 56 of a gas transfer unit, respectively.
[0025] Moreover, insertion and removal of the heater 51 of the shape of a tape to the retention groove 6 and 7 of the heat transfer block 1 and the subheat transfer block 3 can be simply performed only in the actuation from the upper part, and ****** skill, and its repeatability is good. Therefore, even when the tape-like heater 51 is once removed for the reasons of a maintenance etc. and it equips again, the same temperature conditions as maintenance before are acquired easily. Furthermore, desorption can be simply carried out only in the actuation from the upper part not only about the tape-like heater 51 but about the solenoid valve 53 with a mass flowmeter.
[0026] As explained to details above, according to the gas transfer unit of this example, the heat of the tape-like heater 51 is transmitted to the solenoid valve 53 with a mass flowmeter through the heat transfer block 1 of the solenoid valve 53 with a mass flowmeter to which it is caudad prepared and is stuck by energization of the press spring 2. Moreover, the heat of the tape-like heater 51 is transmitted to input block 10 and an output block 11 through the subheat transfer block 3 attached to input block 10 and an output block 11. For this reason, even when supplying a gas like the JIKURORU silane F which is easy to liquefy, it can supply certainly, without making a gas liquefy.
[0027] Moreover, in the heat transfer block 1 and the subheat transfer block 3, since it holds to the retention groove 6 and 7 to which Kaisei of the upper part was carried out, the repeatability when being able to equip a gas transfer unit only by the actuation from the upper part at homogeneity, once removing, and equipping again is also good. For this reason, it excels in the homogeneity and stability of the temperature in a gas transfer unit. Moreover, since the solenoid valve 53 with a mass flowmeter is attached through the attachment blocks 24 and 25 which can carry out desorption only by the actuation from the upper part, a maintenance space that the activity at the time of desorption is easy and big is not required.
[0028] In addition, of course, various deformation and amelioration are possible within limits which said example does not limit this invention at all, and do not deviate from the summary. For example, although considered as the gas transfer unit which supplies the JIKURORU silane F in this example, if it is the gas which is easy to liquefy, it can apply, even if it supplies other gases, such as 6 tungsten fluoride and chlorine trifluoride, and will not eliminate using it for a gas without fear of liquefaction like a mono silane, either. Moreover, if the quality of the material of the heat transfer block 1 and the subheat transfer block 3 is the high quality of the material of aluminum or not only an aluminum alloy but thermal conductivity, it is good anything. Moreover, as a flow control valve with a mass flowmeter, although the solenoid-valve type solenoid valve 53 with a mass flowmeter was used, you may be things, such as piezo types, thermal types, etc. other than a solenoid-valve type. Moreover, you may be a solenoid valve although the input open clausilium 54, a purge valve 55, and the output open clausilium 56 considered as the air operation valve.
[0029]
[Effect of the Invention] According to this invention, the heat of an exoergic means is transmitted to a flow control valve with a mass flowmeter like [it is ****** from having explained above and] through the heat transfer member to which it is stuck by energization of a press spring. Since the heat of an exoergic means is transmitted to input block and an output block through the 2nd heat transfer member The heating incubation of the gas path in a gas transfer unit can be carried out at homogeneity beyond predetermined temperature, and the outstanding gas transfer unit which can supply only an initial complement certainly also about gases which are easy to liquefy, such as a JIKURORU silane, without making it liquefy can be offered. Thereby, improvement in the product step stop in a semiconductor manufacturing process etc. can be aimed at.
[0030] Moreover, since desorption of an exoergic means, or a flow control valve with a mass

flowmeter and others can be performed only by the actuation from the upper part, the maintenance space in which workability is good and excessive is not required. Moreover, also when an exoergic means etc. is once removed for exchange or an overhaul and it equips with it again, the condition before exchange or an overhaul can be recovered without being based on an operator's **** etc., and repeatability, such as temperature conditions, can improve the stability of operation of a process well.

[Translation done.]